

## Agricultural Chemical Usage

The 2004 chemical use summaries for vegetables and field crops provide pesticide use data on 7 Michigan vegetable crops and winter wheat. Vegetable chemical use statistics are published every other year, alternating with fruit chemical use statistics. Information is provided from a survey funded by the USDA Pesticide Data Program to provide reliable pesticide use statistics and to enhance the quality of information on pesticide residues in food. This data series addresses the increased public interest in agricultural chemical use and provides the means for government agencies to

respond effectively to food safety and water quality issues. The entire series of chemical usage statistics since 1990 for Michigan and the U.S. can be found on the NASS website at <http://www.usda.gov/nass/>. A list of associated trade names is provided following the chemical application tables as an aid in reviewing the data. The list does not mean to imply use of any specific trade name.

### Asparagus: Agricultural chemical applications, 2004 <sup>1</sup>

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
Herbicides					
2,4-D	15	1.1	0.88	0.93	2.2
Diuron	91	1.8	1.21	2.18	30.7
Glyphosate	89	1.5	0.80	1.21	16.7
Linuron	4	1.2	0.78	0.94	0.6
Metribuzin	70	1.6	0.48	0.77	8.5
Paraquat	25	1.2	0.56	0.67	2.6
S-Metolachlor	8	1.2	1.19	1.42	1.7
Terbacil	3	1.3	0.27	0.35	0.2
Insecticides					
Carbaryl	85	3.1	0.66	2.04	27.0
Fungicides					
Chlorothalonil	58	2.5	1.28	3.26	29.2
Mancozeb	36	2.3	1.46	3.36	19.0

<sup>1</sup> Planted acres in 2004 were 15,500 acres.

### Snap Beans, Processing: Agricultural chemical applications, 2004 <sup>1</sup>

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
Herbicides					
Bentazon	65	1.1	0.43	0.47	5.5
EPTC	18	1.0	2.59	2.59	8.3
Fomesafen	62	1.1	0.11	0.12	1.3
Quizalofop-P-ethyl	8	1.0	0.05	0.05	0.1
S-Metolachlor	71	1.2	0.87	1.03	12.8
Sethoxydim	11	1.0	0.17	0.17	0.3
Trifluralin	18	1.0	0.58	0.58	1.8
Insecticides					
Acephate	56	1.1	0.75	0.85	8.4
Bifenthrin	41	1.3	0.04	0.06	0.4
Dimethoate	25	1.0	0.26	0.26	1.2
Disulfoton	15	1.1	1.02	1.09	2.9
Fungicides					
Vinclozolin	58	1.0	0.53	0.53	5.4

<sup>1</sup> Planted acres in 2004 were 17,700 acres.

**Carrots, Fresh: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
Herbicides					
Linuron	97	2.3	0.60	1.40	6.0
Fungicides					
Chlorothalonil	57	5.1	1.06	5.34	13.3

<sup>1</sup> Planted acres in 2004 were 4,400 acres.

**Sweet Corn, Fresh: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
Herbicides					
2,4-D	1	1.2	1.06	1.27	0.1
Acetochlor	2	1.0	1.54	1.54	0.3
Alachlor	17	1.0	2.00	2.00	3.6
Atrazine	75	1.0	1.04	1.08	8.4
Bentazon	26	1.0	0.53	0.53	1.4
Dimethenamid-P	5	1.0	0.58	0.58	0.3
Glyphosate	3	1.0	0.60	0.60	0.2
Pendimethalin	17	1.0	0.97	0.97	1.7
S-Metolachlor	34	1.1	1.15	1.29	4.6
Insecticides					
Carbaryl	3	3.1	1.29	3.96	1.1
Cyfluthrin	13	1.7	0.03	0.05	0.1
Diazinon	1	1.4	1.82	2.53	0.3
Esfenvalerate	13	1.8	0.03	0.06	0.1
Lambda-cyhalothrin	57	3.4	0.03	0.09	0.5
Methomyl	12	1.9	0.33	0.61	0.8
Permethrin	10	2.8	0.14	0.39	0.4
Thiodicarb	12	2.6	0.62	1.59	2.0
Fungicides					
Mancozeb	2	2.0	1.28	2.57	0.6
Propiconazole	11	1.6	0.11	0.17	0.2

<sup>1</sup> Planted acres in 2004 were 10,500 acres.

**Cucumbers, Fresh: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
Herbicides					
Ethalfluralin	56	1.0	0.62	0.64	2.7
Glyphosate	2	1.4	1.19	1.64	0.3
S-Metolachlor	5	1.2	1.57	1.86	0.7
Insecticides					
Carbaryl	3	1.9	0.70	1.33	0.3
Endosulfan	6	2.0	0.53	1.08	0.5
Esfenvalerate	12	3.1	0.03	0.10	0.1
Permethrin	47	2.9	0.09	0.27	1.0
Fungicides					
Azoxystrobin	63	1.4	0.17	0.23	1.1
Chlorothalonil	87	2.4	1.42	3.39	22.3
Copper hydroxide	90	3.4	0.54	1.87	12.6
Mancozeb	5	4.1	0.91	3.78	1.4

<sup>1</sup> Planted acres in 2004 were 7,500 acres.

**Cucumbers, Pickles: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
<b>Herbicides</b>					
Clomazone	44	1.0	0.16	0.16	2.5
Ethalfuralin	72	1.0	0.70	0.70	17.6
Halosulfuron	25	1.0	0.03	0.03	0.2
Naptalam	5	1.0	1.74	1.74	2.8
<b>Fungicides</b>					
Chlorothalonil	4	1.7	1.19	2.08	3.0
Copper hydroxide	8	1.4	0.58	0.85	2.5

<sup>1</sup> Planted acres in 2004 were 35,000 acres.

**Pumpkins: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
<b>Herbicides</b>					
Clomazone	38	1.0	0.45	0.47	1.4
Ethalfuralin	41	1.0	0.80	0.82	2.6
Glyphosate	7	1.0	0.82	0.83	0.5
Halosulfuron	15	1.1	0.03	0.03	( <sup>2</sup> )
S-Metolachlor	3	1.0	1.41	1.41	0.3
<b>Insecticides</b>					
Carbaryl	23	3.3	1.14	3.76	6.7
Carbofuran	5	1.0	0.62	0.62	0.2
Endosulfan	16	2.8	0.69	1.94	2.4
Esfenvalerate	17	4.0	0.03	0.13	0.2
Imidacloprid	2	1.0	0.15	0.15	( <sup>2</sup> )
Malathion	5	1.2	0.86	1.00	0.4
Permethrin	9	1.5	0.13	0.19	0.1
<b>Fungicides</b>					
Azoxystrobin	4	1.8	0.15	0.26	0.1
Chlorothalonil	56	3.3	1.21	3.97	17.3
Copper hydroxide	43	2.8	0.53	1.51	5.1
Mancozeb	6	1.8	0.64	1.15	0.5
Mefenoxam	7	1.4	0.16	0.22	0.1
Myclobutanil	22	2.0	0.09	0.19	0.3
Thiophanate-methyl	9	1.5	0.31	0.47	0.3
Trifloxystrobin	4	1.2	0.06	0.07	( <sup>2</sup> )

<sup>1</sup> Planted acres in 2004 were 7,800 acres.

<sup>2</sup> Area applied is less than one percent.

**Squash: Agricultural chemical applications, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 lbs</i>
<b>Herbicides</b>					
Clomazone	29	1.1	0.25	0.26	0.5
Ethalfuralin	43	1.1	0.79	0.85	2.6
Glyphosate	5	1.1	1.04	1.10	0.4
S-Metolachlor	8	1.1	1.52	1.70	0.9
<b>Insecticides</b>					
Carbaryl	25	1.8	0.66	1.17	2.1
Endosulfan	12	1.8	0.62	1.13	0.9
Esfenvalerate	32	2.7	0.03	0.09	0.2
Malathion	4	1.4	1.29	1.75	0.4
Permethrin	35	2.3	0.12	0.28	0.7
<b>Fungicides</b>					
Chlorothalonil	68	2.7	1.35	3.64	17.7
Copper hydroxide	45	3.7	0.52	1.94	6.2
Dimethomorph	7	3.0	0.03	0.09	( <sup>2</sup> )
Mancozeb	9	3.6	0.89	3.18	2.1
Mefenoxam	12	1.0	0.10	0.11	0.1
Myclobutanil	13	1.6	0.09	0.14	0.1
Thiophanate-methyl	4	1.0	0.16	0.16	0.1
Trifloxystrobin	8	1.5	0.31	0.46	0.3
	2	1.0	0.06	0.06	( <sup>2</sup> )

<sup>1</sup> Planted acres in 2004 were 7,200 acres.

<sup>2</sup> Area applied is less than one percent.

**Fertilizer applications: Winter wheat, 2004 <sup>1</sup>**

Fertilizer	Symbol	Area applied	Applications	Rate per application	Rate per crop year	Total applied
		<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>Million pounds</i>
Nitrogen	N	97	2.2	53	115	73.5
Phosphate	P <sub>2</sub> O <sub>5</sub>	71	1.2	50	59	27.5
Potash	K <sub>2</sub> O	77	1.2	64	75	38.4

<sup>1</sup> Planted acres in 2004 were 660,000 acres.

**Agricultural chemical applications: Winter wheat, 2004 <sup>1</sup>**

Agricultural chemical	Area applied	Applications	Rate per application	Rate per crop year	Total applied
	<i>Percent</i>	<i>Number</i>	<i>Pounds per acre</i>	<i>Pounds per acre</i>	<i>1,000 pounds</i>
<b>Herbicides</b>					
2,4-D	12	1	0.42	0.42	34
2,4-DP, Dimeth. Salt	5	1	0.52	0.52	16
Acetic acid (2,4-D)	3	1	0.60	0.60	12
Glyphosate	2	1	0.74	0.74	9
Thifensulfuron	20	1	0.01	0.01	2
Tribenuron-methyl	16	1	0.006	0.006	1
<b>Insecticides</b>					
Lambda-cyhalothrin	3	1	0.02	0.02	1
Zeta-cypermethrin	8	1	0.04	0.04	2
<b>Fungicides</b>					
Propiconazole	4	1	0.08	0.08	2
Tebuconazole	8	1	0.11	0.11	6

<sup>1</sup> Planted acres in 2004 were 660,000 acres.

## Agricultural chemicals: Common and trade names by class

### Herbicides

Common name	Trade name	Common name	Trade name
2, 4-D	several names	Imazethapyr	Pursuit
2, 4-D, Dimeth. salt	several names	Linuron	Linex, Lorox
Acetic acid	several names	Metribuzin	Lexone, Sencor
Acetochlor	Degree Xtra, Harness Xtra, Keystone, TopNotch	Naptalam	Alanap-L
Alachlor	several names	Paraquat	Gramoxone, Starfire
Atrazine	several names	Pendimethalin	Pendimax, Prowl, Prozine, Pursuit
Bentazon	Basagran, Conclude Xtra, Laddok, Manfiest, Pledge	Sethoxydim	BASF Poast, Manifest, Poast, Rezult G
Clomazone	Command, Strategy	S-Metolachlor	Bicep, Cinch, Dual Magnum, Lumax
Dimethenamid-P	G-Max, Guardsman, Outlook	Terbacil	Sinbar
Diuron	Direx, Diurin, Karmax	Thifensulfuron	Ally Extra, Canvas, Harmony, Pinnacle
Ethalfuralin	Sonolan, Curbit, Strategy	Tribenuron-methyl	Ally Extra, Canvas, Express, Harmony, X-TRA (Cheyenne)
Glyphosate	several names	Trifluralin	Preen, Treflan, Tri-4, Trifluralin, Trilin, Trust
Halosulfuron	Permit, Sandea		

### Insecticides

Bifenthrin	Brigade, Capture, Discipline, Empower	Imidacloprid	Admire, Marathon, Provado
Carbaryl	Sevin	Lambda-cyhalothrin	Karate, Warrior
Carbofuran	Furadan	Malathion	Cythion, Fyfanon
Cyfluthrin	Aztec, Bayer Adv. Garden Powerforce, Baythroid, Renounce	Permethrin	Ambush, Arctic, Perm-up, Permethrin, Pounce
Diazinon	D-264, Diazinon, D-z-n Diazinon	Thiodicarb	Larvin
Endosulfan	Endosulfan, Phaser, Thiodan, Thionex, Thirethrin	Zeta-cypermethrin	Fury, Mustang
Esfenvalerate	Asana, Curbit, Ortho Bug-B-Gon, Sonalan, Strategy		

### Fungicides

Azoxystrobin	Amistar, Quadris (aka Abound), Quilt	Myclobutanil	Nova, Rally
Chlorothalonil	several names	Propiconazole	Artisan Peanut, Bravo, Bumper, PropiMax, Quilt Stratego, Tilt
Copper hydroxide	several names	Pyraclostrobin	Cabrio, Headline, Pristine
Dimethomorph	Acrobat	Tebuconazole	Folicur
Mancozeb	several names	Thiophanate-methyl	Thiophanate Methyl, Topsin
Mefenoxam	Flourish Ultra, Flouronil, Ridomil	Trifloxystrobin	Flint

**Commercial fertilizer consumption: 2000-2004 <sup>1</sup>**

Item	Year ending June 30				
	2000	2001	2002	2003	2004
	<i>Short tons</i>	<i>Short tons</i>	<i>Short tons</i>	<i>Short tons</i>	<i>Short tons</i>
<b>Primary plant nutrients</b>					
Total N	249,543	238,810	240,680	238,296	264,850
N in multi-nutrients	57,104	55,076	55,048	60,449	60,405
Total P <sub>2</sub> O <sub>5</sub>	87,001	85,873	84,734	85,485	94,352
P <sub>2</sub> O <sub>5</sub> in multi-nutrients	84,539	83,794	82,377	83,193	92,225
Total K <sub>2</sub> O	202,481	184,568	189,200	189,463	210,479
K <sub>2</sub> O in multi-nutrients	47,828	47,563	41,924	45,298	46,989
Total plant nutrients	539,024	509,251	514,615	513,243	569,680
Average analysis	42.9	42.6	43.1	40.1	41.1
Total nutrients in multi-nutrients	189,471	186,433	179,349	188,940	199,620
<b>Selected single-nutrient materials</b>					
Ammonium nitrate	5,622	6,287	5,405	7,856	6,619
Anhydrous ammonia	56,757	50,984	52,766	39,235	43,551
Nitrogen solutions	265,544	288,641	284,355	285,787	323,712
Urea	126,452	110,001	107,305	107,854	132,493
Ammonium sulfate	22,477	22,164	23,569	25,294	30,376
Concentrated superphosphate	4,966	3,945	4,984	4,515	4,139
Potassium chloride	250,410	221,427	236,720	231,668	259,011
<b>Multiple-nutrient fertilizers</b>					
N-P-K	361,992	366,861	334,670	265,924	294,691
N-P	115,616	122,840	129,900	133,062	142,136
N-K	22,281	24,353	27,096	34,853	33,024
P-K	4,561	4,771	3,831	2,828	3,129
<b>Leading multiple-nutrient grades</b>					
10-34-0	37,385	40,775	44,303	46,717	50,860
18-46-0	34,569	33,232	36,672	37,149	35,938
11-52-0	24,987	26,571	24,636	25,865	34,428
8-18-5		5,675	5,614	8,703	18,675
19-19-19	14,353	13,035	13,989	12,709	16,547
12-12-12	11,564	7,403	7,528	6,641	7,916
<b>Fertilizer consumption by classes</b>					
Dry bulk single-nutrient	452,227	382,845	392,966	443,887	472,774
Dry bagged single-nutrient	7,453	14,862	23,385	40,127	35,943
Fluid single-nutrient	324,357	343,883	339,295	343,115	373,002
Dry bulk multiple-nutrient	259,482	243,576	223,668	231,005	248,576
Dry bagged multiple-nutrient	165,491	188,375	187,396	132,037	150,598
Fluid multiple-nutrient	79,476	86,874	84,433	73,625	73,805
Organics, secondary and micronutrients	39,220	24,729	31,883	84,679	60,845
<b>Total</b>	<b>1,327,707</b>	<b>1,285,144</b>	<b>1,283,026</b>	<b>1,348,475</b>	<b>1,415,544</b>

<sup>1</sup> Source: The Association of American Plant Food Control Officials